*The American Annual of Photography,* 1912. Vol. xxvi. Edited by Percy Y. Howe. Pp. 328. (New York: The American Annual of Photography; London: G. Routledge and Sons, Ltd., 1911.) Price 3*s*. 6*d*.

IN these pages the photographic reader will find much that will interest him, for a host of photographic subjects are delightfully treated, and the illustrations are both numerous and good. Turning over the pages one finds some simple hints regarding telephoto lenses, then a brief discourse on the fascinating procedure of taking photographs against the light productive of many pretty pictures. Simple apparatus for photomicrography and sensitising platinum paper are later dealt with, followed by an interesting article on "Daguerreotype Copying." Much useful information is imparted to the reader in the articles on stereoscopic night scenes, botanical photography, colouring photographs, the English cathedrals, &c. Nearly all the various subjects dealt with are well illustrated, and these add greatly to the value of the annual. At the end there is brought together a typical collection of formulæ and tables which will no doubt be found useful to the working photographer. Good indices to the articles, subjects, illustrators, and advertisers facilitate easy references to the various portions of the book.

*Einführung in die Mykologie der Nahrungsmittelgewerbe.* By Prof. A. Kossowicz. Pp. viii + 138. (Berlin: Gebrüder Borntraeger, 1911.) Price 4 marks.

THIS book deals with bacteria, yeasts, and moulds in their special relation to foodstuffs, and forms a welcome addition to technical bacteriology. Portions of it particularly concern the domestic arts, and would be of service in connection with courses of "domestic or home science," a branch of training which is now coming to the fore. Commencing with a brief introduction on the morphology and methods of study of the organisms dealt with, the subjects of milk, butter, and cheese are first considered. Then follows the more special section of the book, which is devoted to the consideration of the decomposition and preservation of meat and fish, eggs, vegetables, and fruit. In this the various organisms producing the "spoiling" of these foodstuffs are briefly considered, together with the chief methods of conserving food. It is interesting to learn that the air of the Cuxhaven fish market is ozonised, with the result that the fishy odour is destroyed. Finally, the mycology of the bakery, of sugar, and of fodder is briefly described. The book is a very readable one, and is well and sufficiently illustrated.

R. T. H.

## *LETTERS TO THE EDITOR.*

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

### Spectroscopic Methods.

IN his interesting address on spectroscopic methods, Prof. Michelson falls into a not uncommon error when he says that, in order to obtain a pure spectrum, "two important modifications must be made in Newton's arrangement. First, the light must be allowed to pass through a very *narrow* aperture, and, secondly, a sharp *image* of this aperture must be formed by a lens or mirror."

Both these modifications were made by Newton himself, and with a clear understanding of their advantages. In "Opticks,' Exper. 11, we read:—"In the sun's light let into my darkened chamber through a small round hole in my window—shut, at about 10 or 12 feet from the window, I placed a lens, by which the image of the hole might be distinctly cast upon a sheet of white paper, placed at the distance of six, eight, ten, or twelve feet from the lens. . . . For in this case the circular images of the hole which comprise that image . . . were terminated most distinctly without any penumbra, and therefore extended into one another the least that they could, and by consequence the mixture of the heterogeneous rays was now the least of all."

And further on:—

"Yet instead of the circular hole F, 'tis better to substitute an oblong hole shaped like a long parallelogram with its length parallel to the prism ABC. For if this hole be an inch or two long, and but a tenth or twentieth part of an inch broad or narrower, the light of the image *pt* will be as simple as before or simpler [*i.e.* as compared with a correspondingly narrow circular hole], and the image will become much broader, and therefore more fit to have experiments tried in its light than before."

Again, it was not Bunsen and Kirchhoff who first introduced the collimator into the spectroscope. Swan employed it in 1847, and fully described its use in Edin. Trans., vol. xvi., p. 375, 1849. See also Edin. Trans., vol. xxi., p. 411, 1857; Pogg. Ann., C, p. 306, 1857.

These are very minor matters as compared with what Prof. Michelson has to tell of his own achievements and experiences, but it seems desirable that they should be set right.

R.

### Are Eyes ever Autophanous?

THE following communication was written about 1889, soon after my change of residence from Collingwood (in Kent) to Slough (in Buckinghamshire), that is, about twenty-three years ago, and having been laid aside, through the intervention of other interests, has now come to light again in weeding the accumulation of half a rather long lifetime. It seemed unadvisable to recast, from memory, what was set down from present observation. At the same time, the form in which those observations are presented required explanation, such as is now offered.

I propose in the present letter to describe some observations of a rather unique character, and have thought that the occasion warrants my coining a word in connection with—though not descriptive of—their general nature. I had never given much credence to the sayings and statements, not infrequently met with, expressive of a rather widely entertained belief that the eyes of some animals, especially those of the feline *genera*, have the property of "shining in the dark," of emitting light, or (as I now venture to describe it) of being *autophanous*. But I saw no prospect of disproving its existence until accident pointed out a ready way of producing the effect, and thus raising a pretty strong presumption as to the true source of the belief. I propose in a few words to put your readers in a position to verify and extend my subsequent experience, and to enable all who try it to judge for themselves whether the suggested explanation is not sufficient, without attributing to the eye a specific inherent luminosity.

About five years ago I was presented with a puppy, of a good breed of collie, the history of which I must briefly summarise by saying that, until I lost him last November, he was my constant companion day and night. His sleeping quarters during the spring and summer months of '84 were in a kennel placed on the landing of a flight of stone steps leading up to a garden door facing my habitual seat in an inner room, so that we could always see each other when the intervening doors were open. When there was a lamp on the table it was not long before I learnt to look for, and generally to see, Bruno's great eyes watching me out of the darkness. It is immaterial now to recall exactly by what successive steps I learnt the essential conditions of the phenomenon: they now seem so obvious. Eventually I was led to use a bull's-eye lantern, the adoption of which opened the wide field of experience of which I will now endeavour to give some particulars. Let it not be supposed that it is enough to direct the light of a lantern upon a dog's eyes. If such were the case, the observation would long since have been made; for it is by no means essential that the dog's sight shall be turned directly upon the source of light, as will presently appear. What is essential, and what makes all the difference between what the holder of the lantern sees and what a

© 1912 Nature Publishing Group

bystander sees, is that the eye of the observer shall be as nearly as practicable in a line with the light and the reflecting eyeball. A policeman, for instance, may go his rounds night after night for years carrying his bull's-eye at the usual waistbelt level, and never have a notion of the numberless pairs of cats' eyes which he would infallibly see along the area rails should he raise it to the level of his face, so as to look closely past his hand. There! I have let out my secret, and it only remains to tell what I have seen in this way.

First, then, as to Bruno. It was my habit to stroll in the garden with him of an evening, and I carried a bull's-eye, by means of which I could always see where he was, provided he was not moving away from me, or otherwise having both eyes hidden. As to the distance, the next observation will give a fair idea. It was the way I generally chose to show the sight to other people. Bruno's greatest pleasure in life—next to accompanying me with a gun—was to run after a ball, and after bringing it back to gnaw it if not prevented. He would always prefer his ball to his food if the former was thrown. His power of scent was something remarkable. Hundreds of times have I thrown his ball—wooden ones, which I turned for him in the lathe as required, owing to his aforesaid destructive practice, like full-sized croquet balls—when it was too dark to see where he was, and he has never failed to find and bring it, being guided as to general direction partly by my action and partly by the sound of the ball falling. Taking advantage of this, I could always send him forth into the darkness with the certainty that he would shortly be seen[1] by anyone holding a bull's-eye properly, returning in the form of a pair of gig lamps bounding towards one in an undulatory fashion most ludicrous to see. Under such favourable conditions fifty yards would be quite an easy distance.

I will now pass on to cats. My experience of cats' eyes is not so varied, but my belief is that, in relation to their size, they reflect more light. I am sure they could be seen, under similar conditions, at eighty yards, for I have seen them *brilliantly* at half that distance. At greater distances there is not the same inducement for a cat to turn her face in the right direction unless she has taken refuge from a dog, say, in a tree. In such cases I have had good opportunities. The greenish light from a cat's eyes—decided greenness at five yards at least—is easily distinguishable from the redness which is so noticeable in that from a dog's.

The next experience I shall mention relates to sheep. I was completely deceived the first time I saw the light in sheep's eyes. A flock had been let into the field adjoining my evening walk without my knowledge, and there had not been any there for, maybe, a fortnight. Moreover, it was in the early days of my discovery of this amusement, and I had not anticipated its range. However that may be, the appearance of a number of lights, moving and stationary, some down in a hollow, all more or less faint and shimmering, gave me quite a turn; for I have never myself seen natural lights of this sort such as we hear of. I believe I solved the riddle by getting over the fence—after ascertaining that the phenomenon was connected, in the aforesaid essential way, with the position of my lantern —and studying it *ambulando*, thereby learning, *inter alia*, that sheep's eyes can be seen singly if the beast is walking past, and, of course, equally well, or even better, as a pair if it is facing you. They are certainly visible at fifty or sixty yards' distance with the light of an ordinary bull's-eye as source.

I have also seen rabbits' eyes, in the same way, sufficiently well to speak positively, but not often enough or under favourable enough conditions to describe precisely. The light was certainly feebly seen at about twenty yards.

I have not seen the like satisfactorily in horses myself, but others have seen it.

Lastly, I have failed to see any trace of it in human eyes, nor have I heard of anyone else doing so.

J. HERSCHEL.

---

[1] I am told that readers not in the habit of using such lanterns, naturally suppose that the *dog's whole form* would be seen by its light. The fact is, however, that even a strong light of this kind shows objects very feebly at more than ten yards, unless of a light colour. Practically the dog is not seen at all till quite close.

### The Weather of 1911.

AFTER my letter on the above subject (NATURE, January 11) had been posted, it occurred to me to investigate to what extent temperature deviations in Egypt are opposite to those in England, and for this purpose I compared the annual mean temperatures at Abbassia (near Cairo) with those for England S.W. and South Wales (Weekly Weather Report, 1908, p. 429). This district was selected because Dr. W. N. Shaw, F.R.S. (NATURE, vol. lxxiii., 1905, p. 175), had already compared rainfall in this region with wind velocity at St. Helena, and I had compared the same rainfall with the volume of the Nile flood (Quart. Journ. Roy. Met. Soc., xxxvi., 1910, p. 341).

In the present case, a coefficient of correlation −0·427±0·097 was found for the annual mean temperatures from 1877 to 1910. This looked promising, and an analysis by quarters was then undertaken with the result:—

| | | Temperatures °F. | | | |
|---|---|---|---|---|---|
| | | S.W. England | | Abbassia | |
| | | Mean | S.D. | Mean | S.D. |
| 1st quarter | $r = -0.724 \pm 0·056$ | 41·6 | 1·945 | 57·7 | 1·607 |
| 2nd ,, | $-0·277 \pm 0·108$ | 51·6 | 1·252 | 75·4 | 1·423 |
| 3rd ,, | $-0·165 \pm 0·114$ | 58·5 | 1·397 | 80·8 | 1·316 |
| 4th ,, | $-0·544 \pm 0·083$ | 46·2 | 1·557 | 65·2 | 1·478 |
| Year | $-0·427 \pm 0·097$ | 49·5 | 0·944 | 69·8 | 0·922 |

The column headed S.D. gives the standard deviation, from which, in conjunction with the means and coefficients of correlation, the equations of regression can be obtained.

The connection between temperature in S.W. England and Lower Egypt, as represented by Abbassia, is certainly real in the first and last quarters, but only plausible in the second. What the physical connection may be is a more difficult problem to solve. In the winter half-year Lower Egypt lies close to the axis of the ridge of high pressure which stretches across the Atlantic, northern Africa, and Siberia, and the variations of weather here are dependent very largely on the position of this ridge. It seems probable that the explanation will be found here, but the physical connection would still require investigation. In summer, on the other hand, Egypt lies on the slope between the Atlantic anticyclone and the Indian monsoon depression, and probably receives its weather from different regions from those which control weather in England.

It is hoped to analyse the interrelations more fully and to investigate the position of the boundary between the regions of positive and negative correlation with S.W. England.

J. I. CRAIG.

Survey Department, Giza, Egypt, January 6.

### Microscope Stands.

I HAVE read with interest the article on the above subject in NATURE of December 21 last. It would be interesting to hear if our expert workers agree with the conclusions arrived at.

With regard to the centring of the condenser, in how many of the cheaper Continental stands does one find any accurate means of centring whatever? Also, what grounds are there for the assertion that the mechanical stages on the Continental stands "as instruments of precision are of a higher order than is obtained in the English models"? Then, with reference to the mechanical draw-tube. Which is cheaper, a mechanical draw-tube built with the stand to work with any objective, or a correction collar on each objective? Is the latter arrangement really more accurate than the draw-tube properly used?

I should also like to point out that the worker can easily keep sprung fittings in adjustment for an indefinite period, but ground fittings would require the attention of the repairer. Lastly, is there any evidence obtainable from our most eminent workers with the microscope that the English instrument has lost its former position as the finest scientific instrument of its kind, and that that position is now occupied by the product of a German house?

JOHN A. L. SUTCLIFFE.

Boston Spa, January 5.

© 1912 Nature Publishing Group